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Profile of Environmental Quality Region 8, Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming

(U.S.) Environmental Protection Agency, Denver, CO

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Region 8
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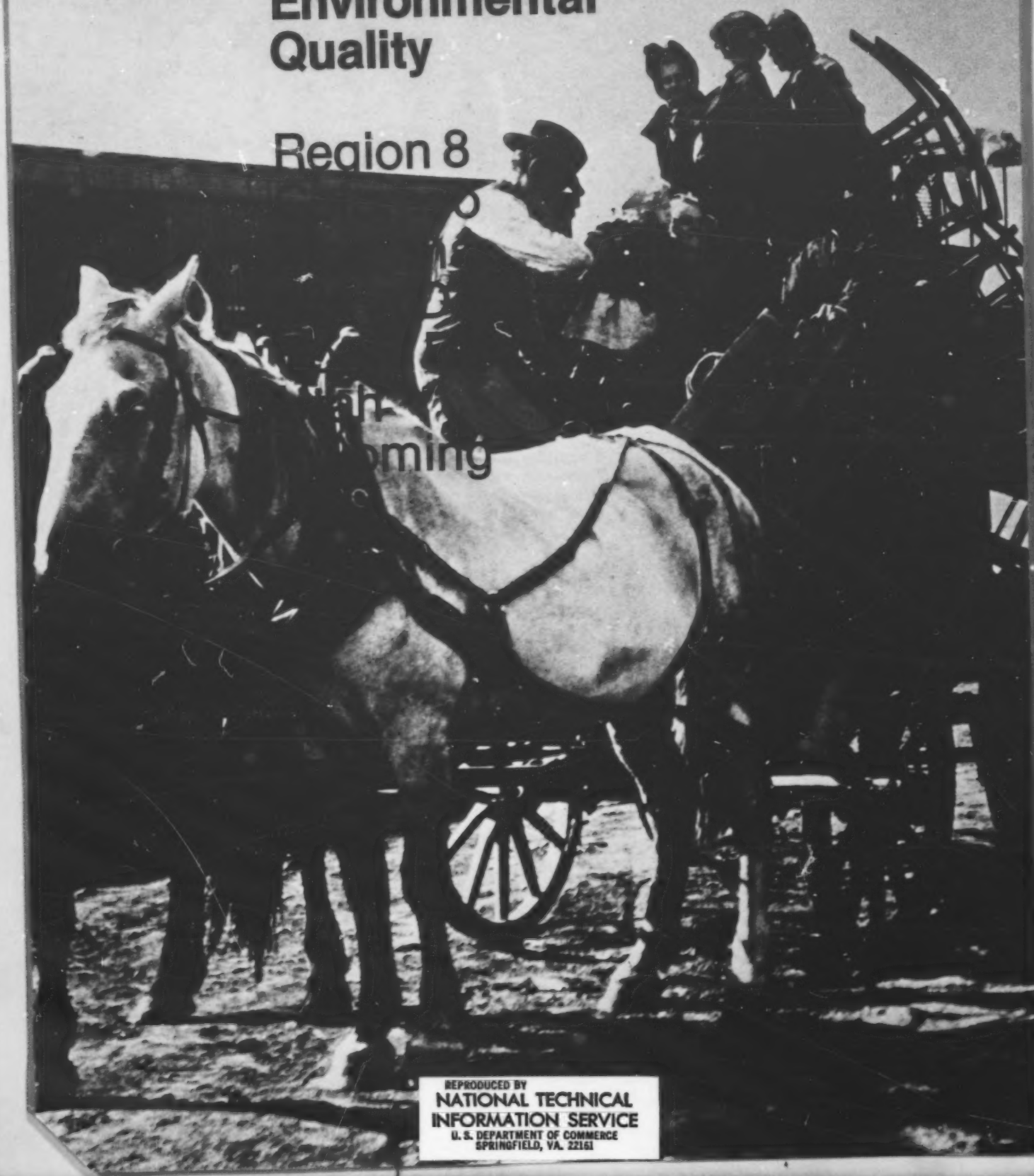
EPA

Profile of Environmental Quality

Region 8



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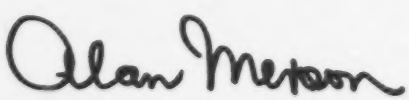
Environmental quality, like happiness, is subject to nearly as many definitions as there are individuals because each of us defines our environment in a highly personal way. For a publication to attempt, then, to define environmental quality is a difficult undertaking. This is our first such attempt. We shall, however, revise this publication each year and hope you will suggest ways for improving it in each succeeding year.

The "Yesterday and Today" theme reflected in the following pages underscores the dual nature of environmental programs in this region — those aimed at correcting past abuses of our air, water and land and those designed to prevent future environmental damage.

They are tasks which must involve each of us as voters, consumers, decision makers and users or suppliers of goods and services. In our individual and collective decisions, we determine our own environmental quality. We invite your participation.



Alan Merson
Regional Administrator

Cover photograph courtesy
State Historical Society of North Dakota

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For supplementary technical background data on air and water quality, see Water and Air Quality Trends in Region 8 (PB-283 280/AS)

16. Abstracts

This report presents a brief overview of some of the problems which affect environmental quality in the Region VIII states of Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. It also discusses EPA's programs aimed at dealing with these problems. Some color maps and graphs may not reproduce satisfactorily.

17. Key Words and Document Analysis. 17a. Descriptors
Air pollution
Water pollution
Solid wastes
Pesticides
Noise
Radiation
Energy development
Environmental quality
Environmental surveys

17b. Identifiers/Open-Ended Terms
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Montana
North Dakota
South Dakota
Utah
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Rocky Mountain states
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17c. COSATI Field/Group

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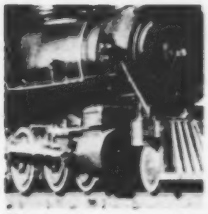
Contents

COLOR ILLUSTRATIONS REPRODUCED
IN BLACK AND WHITE

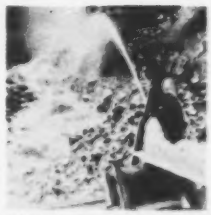
Region 8

Nature has been generous to Region 8. In spite of our abundant natural resources — and often because of them — we face some special environmental problems which the EPA is helping to solve.



Air Quality

On a clear day, how far can you see? Well, we still have areas where pristine air can be preserved. Elsewhere cars, climate, and other factors combine to produce air pollution problems that the EPA is working to correct.



Water Quality

Water is scarce in Region 8, which means good water quality is especially important — and especially difficult to maintain. In administrating the Clean Water Act of 1977, the EPA is working on major programs designed to restore the integrity of our waters.

Solid Wastes

"Waste not, want not" is an old idea, but it received new emphasis in the Resource Conservation and Recovery Act of 1976, which sets the EPA the task of finding better ways to dispose of wastes, particularly of hazardous wastes.

Pesticides

We used to think pesticides killed only pests. Then bald eagles began to disappear, and we learned how far-reaching the effects of pesticides can be. In Region 8 the EPA regulates dangerous pesticides and seeks safer means of pest control.

Noise

The population of Region 8 is growing, and more people mean more noise. Since 1972, when noise was designated an environmental pollutant, Region 8 has sought to reduce environmental noise that threatens our health and welfare.

Radiation

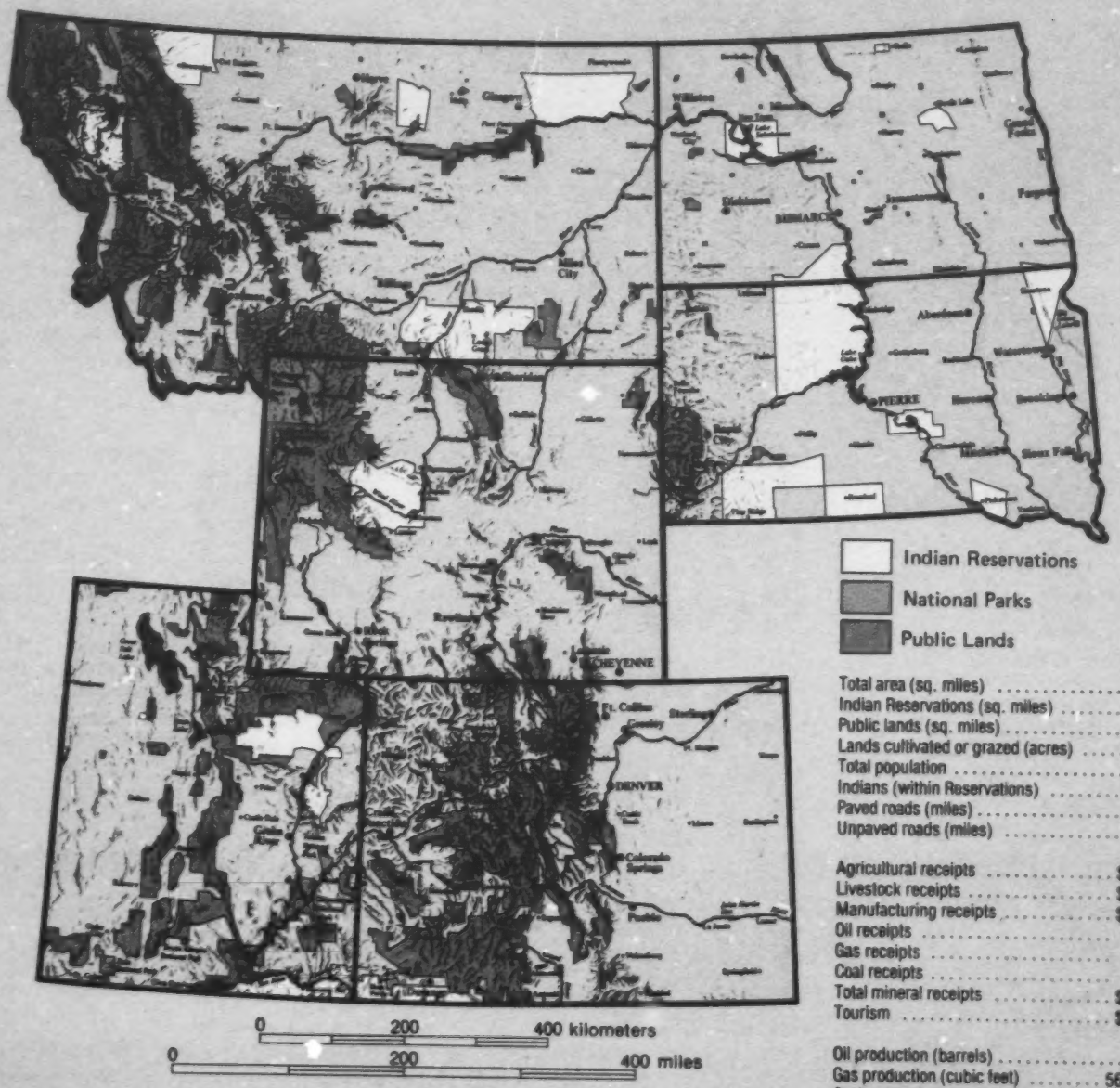
As we learn more about the mysteries of radiation itself, we're also learning more about the impact it can have on the environment. Assessing this impact, particularly when public health and safety are affected, is partly the EPA's responsibility.

Energy Development

Energy booms have come, gone, and come again in our region. Now that the most recent boom is upon us, the EPA is helping to deal with the many wide-ranging environmental consequences of energy development.

Perspective

Geography and geology shape the destiny of our region. But people have a share in that destiny too, and we can face the environmental problems the future holds, confident that we're off to a good start.



Total area (sq. miles)	578,000
Indian Reservations (sq. miles)	29,500
Public lands (sq. miles)	193,000
Lands cultivated or grazed (acres)	238,000,000
Total population	6,400,000
Indians (within Reservations)	99,000
Paved roads (miles)	109,000
Unpaved roads (miles)	317,000
Agricultural receipts	$2,800,000,000
Livestock receipts	$4,366,000,000
Manufacturing receipts	$4,656,000,000
Oil receipts	$902,000,000
Gas receipts	$82,000,000
Coal receipts	$120,000,000
Total mineral receipts	$3,080,000,000
Tourism	$3,400,000,000
Oil production (barrels)	272,000,000
Gas production (cubic feet)	562,000,000,000
Coal production (tons)	27,135,000

Region 8

Region 8 of the Environmental Protection Agency (Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming) is big . . . and beautiful. Within this region can be found magnificent scenery—high jagged mountains, deserts, improbable rock formations, fertile plains, grasslands and prairies, dark green forests, tumbling streams—and still some wide open spaces, still some quiet, untouched wilderness.

But this region has not totally escaped the damage caused by man-made pollution. Environmental problems do exist, or are imminent. Some of them are major. For instance, mountain air, which has 18 percent less oxygen than air at sea level, is polluted more readily. Though relatively few people live in the area, smog can result when they cluster in cities like Denver, Colorado Springs, Pueblo, and Salt Lake City. A brand-new, perfectly tuned automobile puts twice as much carbon monoxide into the air in Denver as it does in Detroit.

Beneath the surface of the six states in the region lie 50 percent of the nation's coal reserves, most of its commercially feasible oil shale, and 40 percent of its economically recoverable uranium. Intense activity to extract these energy-rich fuels is creating boom-towns with every type of pollution problem.

Our dry climate is a major contributor to air and water pollution. Seven major river systems have their beginnings here and continue on to supply water to other regions, but their flow is relatively small and the water they supply must be used many times. Our many small streams are particularly vulnerable to pollution, even in small amounts. The lack of moisture in our region means we must also face the problems created by "fugitive dust," which is in part the loose dirt and sand blown into the atmosphere by drying winds.

Cleaning up past pollution and trying to control its spread are both expensive. But Region 8's small population means that the tax base is also small.

The EPA does not work alone to improve our environment. Instead, it works with and through a great number of other organizations at a variety of levels. In Region 8, these include state and municipal governments, regional councils, hundreds of special districts, private industry, citizen groups, individuals, and the 23 federally recognized Indian reservations located within the region's borders.

Through grants, technical assistance, study, monitoring, and many other means, the EPA plays an active role in such matters of environmental concern as air quality, water quality, solid waste, pesticides, noise, radiation, and energy development. The many programs in these various fields now under way in Region 8 are summarized in the pages that follow, so that the people of our region can learn how the EPA is carrying out its mandate: "to maintain conditions under which man and nature can live in harmony."

Major John Wesley Powell inquiring about water from Paiute Indian. Photograph courtesy Utah State Historical Society

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Air Quality

In 1869 Major John Wesley Powell, explorer of the Grand Canyon, climbed to the top of Mount Dawes in Utah and later wrote in his journal: "To the east, I can see the western slopes of the Rocky Mountains, more than 150 miles distant . . ." Major Powell probably took that faraway vista for granted. He wouldn't do so today.

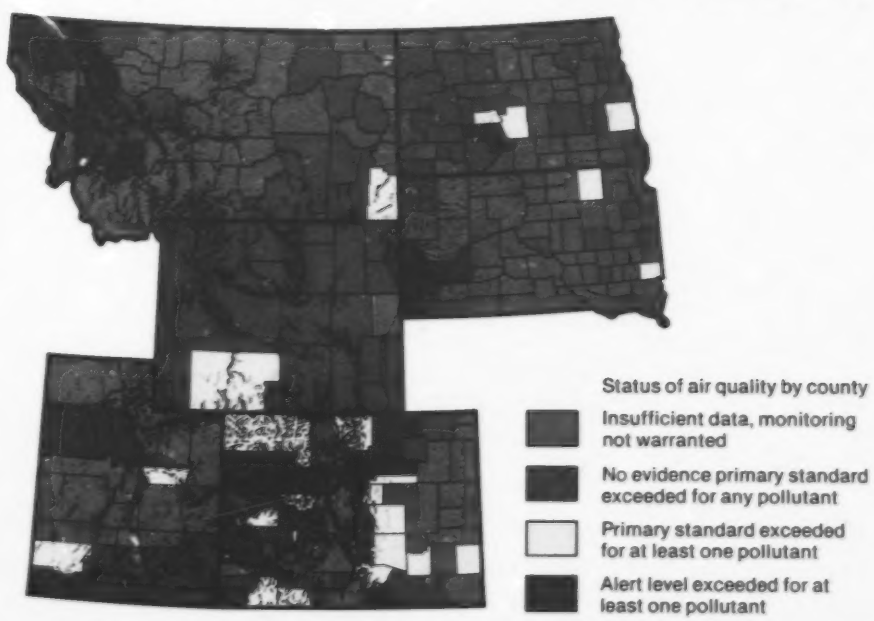
Big changes have come to that once remote, almost unpeopled land: factories and power plants, sprawling cities, resort towns in high mountain valleys, cars, trucks, buses — and now new boom towns.

Fortunately, the need to clean up polluted air and to protect "ambient air" (the air that surrounds us) from deterioration has been recognized in recent years and the EPA is at work on the problems. Nationally, the first priority is improving air that is already poor in quality. But in Region 8, with its many national parks, national forests, and wide open spaces, preserving air that is still good in quality is also a priority.

The EPA used its authority to prevent the deterioration of air quality in 1978 on behalf of the Northern Cheyenne Indian Reservation, legally entitled to air nearly free from "total suspended particulate matter" (TSP) and sulfur dioxide. The EPA denied construction permits for two huge power plants 12 miles away in Colstrip, Montana.

The particular power invoked, called PSD — Prevention of Significant Deterioration — applies when large new sources of pollution are being constructed. These new sources must not pollute more than is allowed by the law.

In Region 8, the EPA and the states monitor the air constantly for certain pollutants, and their findings are now often reported on radio and television. Whenever an air standard is violated, public health can be affected, and when "alert" levels are reached the public (especially people


Status of air quality by county
Insufficient data, monitoring not warranted
No evidence primary standard exceeded for any pollutant
Primary standard exceeded for at least one pollutant
Alert level exceeded for at least one pollutant

Photograph courtesy of the Colorado Heritage Center

Air Quality

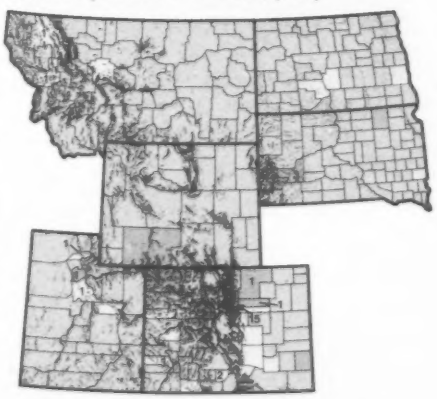
with heart or lung diseases) can be seriously threatened. Primary standards are set to protect human health in general; secondary standards protect against damage to vegetation and materials.

Mountain communities are particularly subject to air-inversion problems when pollutants from cars and fireplaces are trapped near the ground, and all communities can be affected by loose dirt and sand blown from bare ground and dirt roads. (Although controlling this "fugitive dust" can be extremely difficult,

Maps at right show, by county and pollutant, the average number of days per year that air quality standards were exceeded. Small numbers show average number of days per year alert level was exceeded.

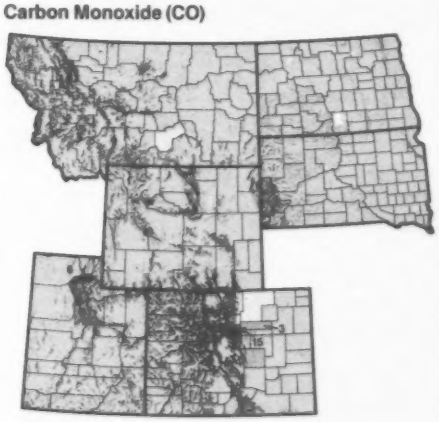
1-10 days
10-20 days
20-40 days
40-60 days
over 60 days

Total Suspended Particulates (TSP)



TSP is a measurement of particles in the air (such as soot, mist, and sprays) and includes non-toxic materials (dust and dirt) as well as toxic materials (lead, asbestos, sulfates). Natural and man-made sources contribute to TSP which affects the respiratory systems in varying degrees depending on particle size and chemical composition.

Carbon Monoxide (CO)



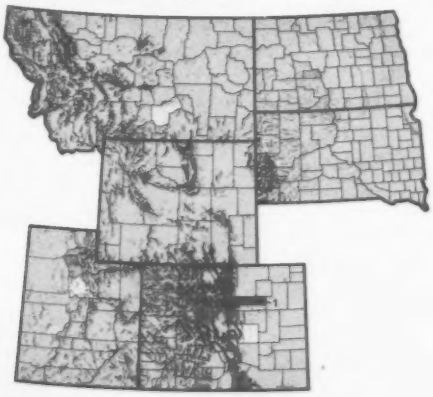
CO is a colorless, odorless, tasteless gas – a toxic product of combustion. The automobile engine represents the major single source of this pollutant. CO in the lungs reduces the oxygen available to tissues and decreases heart and mental functions, visual perception and general alertness. For those with heart and lung problems, CO presents a life-threatening situation.

techniques are available for reducing man's contribution to the problem.) When a community has a problem associated with a particular industry, the EPA helps this community define the problem and take appropriate steps to control it.

Where automobiles — the worst offenders — are concerned, there are no easy answers. Areas that have air-pollution problems but do not have satisfactory plans to bring air quality up to national standards by 1982 (or, in special instances, by 1987) face a cut-off in federal funding for projects that spur growth. In mid-1978 Region 8 decided not to approve a permit for a dam that was part of a new Foothills Water Treatment Project proposed for Denver, partly because the project would encourage the spread of Denver's population and thus add to its air pollution.

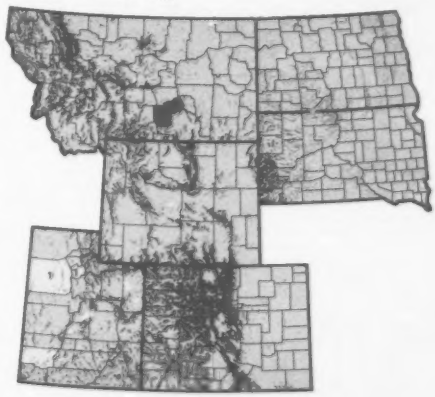
In general, the EPA's task is to set national standards for air quality and then to help the states implement them, tailoring actions taken to the nature and the severity of the problem.

Photochemical Oxidants



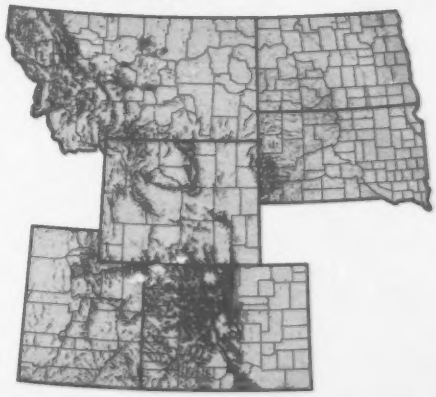
These compounds are formed by a complex series of chemical reactions occurring when hydrocarbons and nitrogen oxides from motor vehicles or other emission sources are exposed to sunlight. Ozone, the critical constituent in oxidants, is a severe irritant to mucous membranes and may reduce lung function or aggravate existing lung disorders.

Sulfur Oxides (SO_x)



Sulfur dioxide (SO_2), the most common form of SO_x in the atmosphere, results from combustion of coal and gas or as a by-product in mineral smelting operations. SO_2 reacts readily with other atmospheric pollutants to form sulfates, a group of compounds responsible for respiratory ailments (bronchitis, emphysema and asthma) and the aggravation of heart disease.

Nitrogen Dioxide (NO_2)



NO_2 is a brown gas formed during high temperature combustion (automobile engines, power plant boilers), NO_2 can affect lung tissue, reduce resistance to disease, contribute to bronchitis or pneumonia, and aggravate chronic lung disease. It reacts with hydrocarbon in the presence of sunlight to produce photochemical oxidants.

Denver County currently exceeding annual primary standards. Salt Lake County indicating potential to exceed.

Water Quality

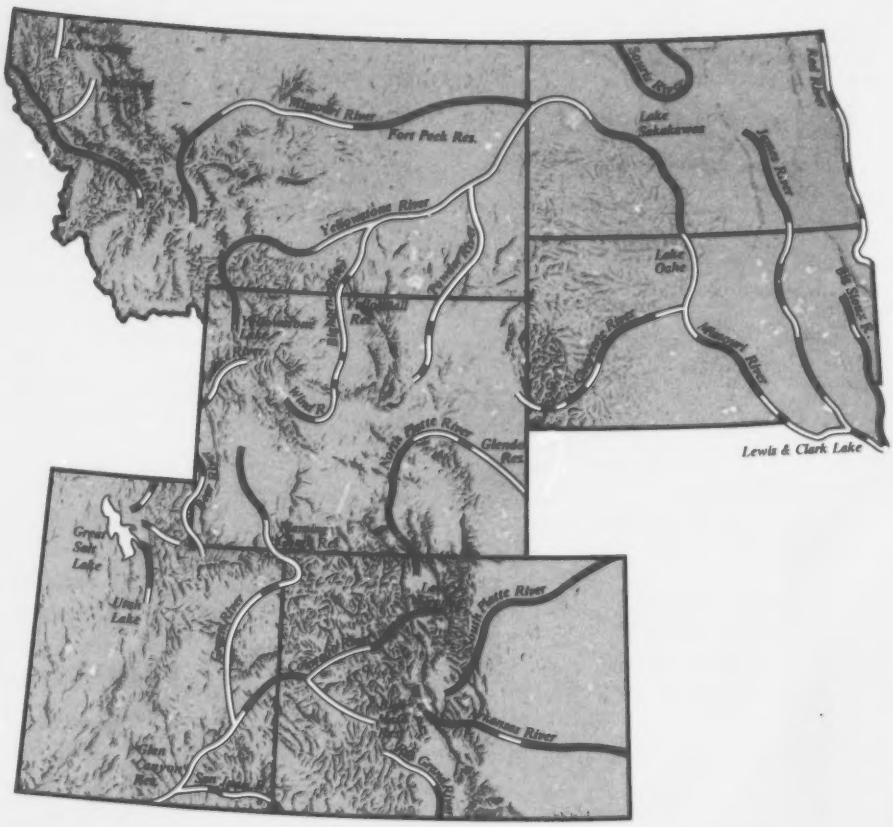
On a bright spring day in 1978, three thirsty cross-country skiers drank water from a stream high in the mountains of southern Colorado. The water was so clear and cold the skiers never doubted it was pure. But they were wrong, as they learned when sickness struck all three. The stream had been polluted by sheep pastured along its banks the previous summer.

This indirect sort of pollution is caused by what is termed a nonpoint source. Such sources are more difficult to identify than point sources that discharge effluents directly into bodies of water, but they are no less important. In Region 8 nonpoint sources contribute 90 percent of the total pollution in our streams and waterways.

Pollution from a nonpoint source is often produced by man's activity. Run-off of all sorts can pollute — the run-off from dirty city streets, from new construction near streams, from mines (even abandoned ones), from fields where pesticides or fertilizers have been used. But nature, too, plays the villain, as the pioneers discovered when their drinking water was fouled by mineral salts leached from the earth.

Because nonpoint sources are essentially indirect, they can be difficult to isolate and control. Further complicating the issue for Region 8 is the fact that our water resources are very limited. If run-off from a construction site carries a given quantity of pollutants, the impact on water quality will clearly be greater if that run-off flows into a sluggish stream than if it flows into the Missouri River.

Hydraulic Mining. Photograph courtesy of the Montana State Historical Society



Region 8 has developed an index technique to assess the relative water quality of regional streams. It was used for making the quality determinations displayed on the six-state map above of color coded stream segments, and for assessment of major contributors to pollutant exceedences on the following two pages. Certain critical pollutant groups were examined and the index was determined from the percentage of these pollutants which exceeded water quality standards.

Water Quality of major streams

- Significant water quality problems
- Intermediate and/or intermittent water quality problems
- Infrequent water quality problems
- Insufficient data

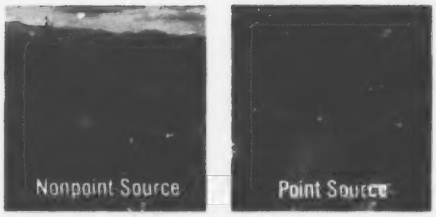
Water Quality

Charts below show exceedences of water quality standards/criteria, by pollutant, for Region 8 river basins.

- Major contributor to exceedences
- Minor contributor to exceedences
- Not a contributor to exceedences
- Insufficient data, but no exceedences presumed

Number of exceedences

- Increasing
- Decreasing



What experts call use impairment refers to a change in the use of a body of water, but not necessarily one caused by adding a pollutant. Impairment can happen more quickly and more drastically in Region 8 than elsewhere in the country. For example, the use of a reservoir for swimming can be impaired when water levels are lowered by demands for water to supply a city's growing population.

The causes and consequences of nonpoint source pollution are so broad that many government agencies besides the EPA are at work on the problem. The EPA does, however, have a major role to play in assessing the problems created by nonpoint source pollution.

Studies called for by Section 208 of the federal Clean Water Act of 1972

Dissolved Oxygen

- Red River of the North
- Souris
- Upper Missouri
- Central Missouri
- So. Central Missouri
- Yellowstone
- James
- Big Sioux
- North Platte
- South Platte
- Middle Colorado
- Upper Colorado
- Green River
- Upper Arkansas
- Upper Rio Grande
- Clark Fork Pend Orielle
- Great Salt Lake

A relatively high dissolved oxygen concentration in a stream is a measure of good quality and indicates that water can adequately support aquatic life and rapid bacteria propagation to assimilate wastes quickly.

Bacteria

- Red River of the North
- Souris
- Upper Missouri
- Central Missouri
- So. Central Missouri
- Yellowstone
- James
- Big Sioux
- North Platte
- South Platte
- Middle Colorado
- Upper Colorado
- Green River
- Upper Arkansas
- Upper Rio Grande
- Clark Fork Pend Orielle
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Excessive levels of bacteria contaminate certain aquatic life forms and cause streams to be unsafe for recreation and human contact. Fecal organisms in the stream indicate the presence of sewage or pollution from men or other warm-blooded animals.

Phosphorous

- Red River of the North
- Souris
- Upper Missouri
- Central Missouri
- So. Central Missouri
- Yellowstone
- James
- Big Sioux
- North Platte
- South Platte
- Middle Colorado
- Upper Colorado
- Green River
- Upper Arkansas
- Upper Rio Grande
- Clark Fork Pend Orielle
- Great Salt Lake

Phosphorous in streams from urban waste water and natural mineral deposits in soil have the characteristic ability to stimulate the production of algae in the presence of nitrogen and can pose a eutrophication hazard to relatively slow moving bodies of water.

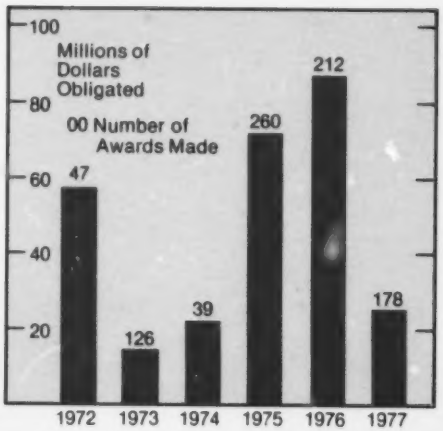
Nitrogen

- Red River of the North
- Souris
- Upper Missouri
- Central Missouri
- So. Central Missouri
- Yellowstone
- James
- Big Sioux
- North Platte
- South Platte
- Middle Colorado
- Upper Colorado
- Green River
- Upper Arkansas
- Upper Rio Grande
- Clark Fork Pend Orielle
- Great Salt Lake

Municipal waste water discharges, livestock wastes, and fertilizers from irrigated fields are the main contributors of nitrogen in streams. Excessive concentrations of most nitrogen forms have deleterious affects on biotic life.

and funded through the EPA are now under way throughout Region 8 and the rest of the country. To date, over 15 million dollars have been allocated within the Region so that state and local governments (including Indian tribes) can produce plans for improving their management of water quality.

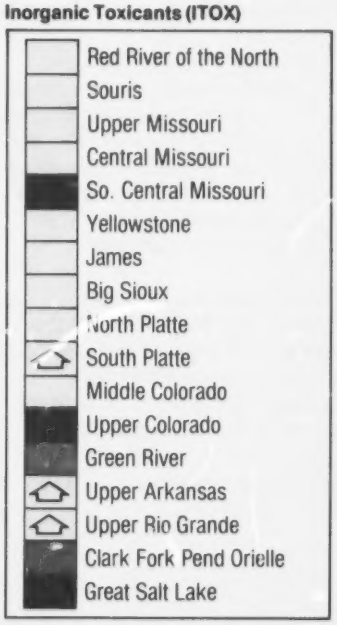
Point sources of pollution, such as a factory that pipes wastes directly into a river, have particularly great impact on water quality in heavily industrialized areas like the eastern United States. But point sources



create problems in Region 8 as well, and controlling these sources is a major objective of the Clean Water Act and other supporting legislation.

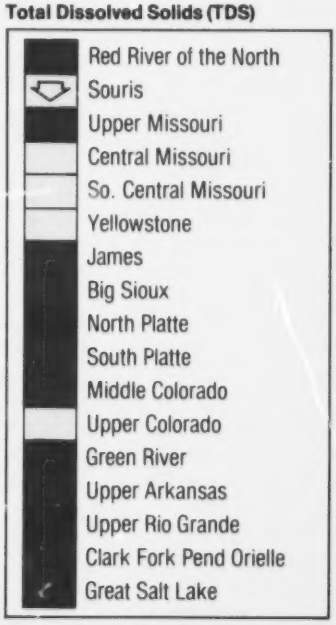
The results show. Since the EPA was formed in 1970, it has had notable success in cleaning up point source pollution, particularly through the following four programs.

Inorganic Toxicants (ITOX)



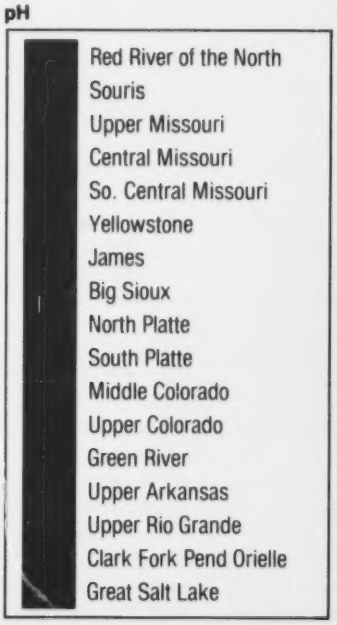
This group includes various chemical elements – primarily the "heavy metals" that are naturally found in water and are essential to life in low concentrations but poisonous when more highly concentrated.

Total Dissolved Solids (TDS)



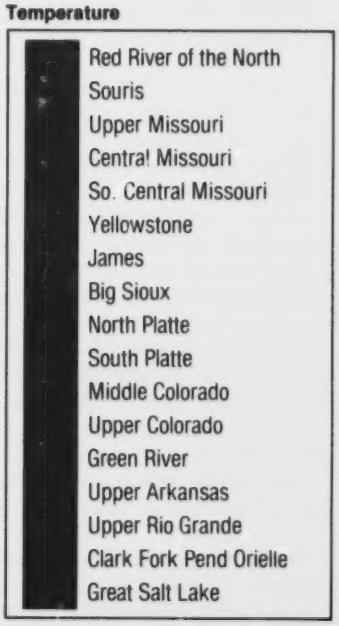
Total dissolved solids is a measure of nongaseous minerals in solution in streams – its relative "saltiness" or "hardness." TDS affects water taste, increases costs for water softening and shortens the life of household plumbing.

pH



pH is a measure of stream acidity or alkalinity. Extremes in pH are generally harmful to aquatic life and speed corrosion processes on manmade structures.

Temperature



Temperature changes govern the nature of biological life, the rate of chemical reactions, and the solubility of gases and solids in streams. As a rule, high temperatures present more pollution problems than low temperatures.

Water Quality

National Pollutant Discharge Elimination System

The National Pollutant Discharge Elimination System (NPDES), which was established in 1972 by Section 302 of the Clean Water Act, requires that all point sources of pollution receive permits from the EPA or from federally-approved state programs. The system sets up a step-by-step schedule that requires sources to reduce pollutants to acceptable levels over a specified period of time. Sources must also monitor and report their discharges on a continuing basis. Exceedences of the compliance schedule or of any permit requirement may result in fines or court action.

To date, the NPDES has proven highly effective as the primary mechanism for regulating discharges from point sources.

Waste Water Treatment Plants

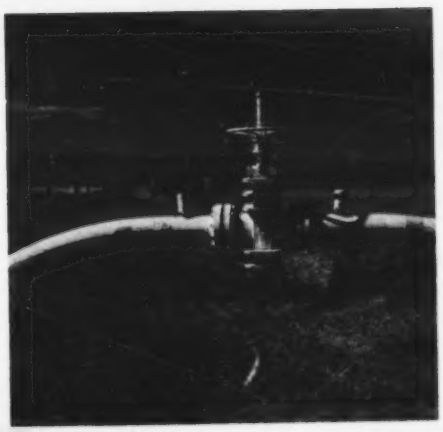
The federal government has recognized for many years that substandard waste water treatment plants are responsible for discharging unacceptably large quantities of pollutants into our water. Yet many small communities cannot afford to improve their treatment facilities. So, through the EPA, the government is providing grants to help those communities that need to construct new treatment plants or to upgrade their existing facilities.

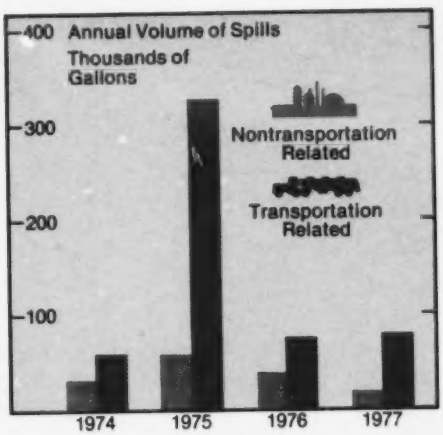
To date, the government has provided 18 billion dollars for these purposes. Region 8 in particular has already received more than 300 million dollars of this amount. Excellent progress is evident in the region, where over 90 percent of the major industrial sources presently meet EPA standards for discharges. A great deal of work still remains to be done, however, at the many municipal treatment plants where facilities do not yet meet minimum requirements. Additional funding will be made available, on a case-by-case basis, until the program deadline is reached on July 1, 1983.

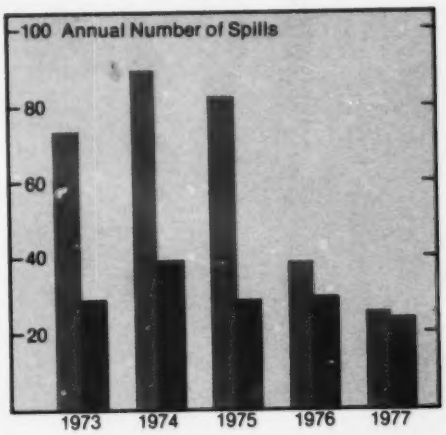
Safe Drinking Water

In 1974 Congress passed the Safe Drinking Water Act, which requires public water suppliers to meet national standards for drinking water. If these standards are exceeded, the supplier must notify consumers, explaining what has been done to correct the problem, or what will be done.

When the program first began, tests showed that 80 percent of the 6,000 public drinking water suppliers in Region 8 could consistently deliver safe drinking water. Because the program is still new, its impact is only beginning to be felt. But even in the first year there has been marked improvement.







Oil Spills

Oil spills can have serious environmental effects — and in the United States an average of one spill is reported every day.

Perhaps the most familiar sorts of spills occur when petroleum products are being transported. Truck accidents are the most frequent cause of what are termed transportation spills (although the largest quantities of oil are actually lost through pipeline breaks).

But spills can also occur during the production process itself, when flow lines between oil wells and storage tanks break, for example, or when pipes become corroded. The total amount of oil spilled in any one of these "nontransportation" spills is often relatively small, but accidents of this sort happen frequently enough and have great enough impact on the environment to be a major cause for concern.

The EPA is responsible for dealing with this second sort of oil spill as well as with all spills that affect the quality of our water. In Region 8, the EPA developed and administers a prevention program for nontransportation oil spills. Seeing that these spills are stopped, cleaning them up, investigating their legal implications, and determining who must pay for the damage are all part of the EPA's responsibility.

The record to date has been excellent. Since 1975, the volume of oil spills from nontransportation sources has steadily and impressively decreased.

Since some spills continue to occur, the EPA maintains a Regional Response Center in Denver, Colorado. The Center, which operates 24 hours a day, seven days a week, is organized so that it can respond to any oil spill anywhere in Region 8 with whatever resources are necessary.

Although the issues are complex and progress is often gradual, Region 8 is nevertheless making a significant contribution toward achieving the primary goal set by the Clean Water Act: "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

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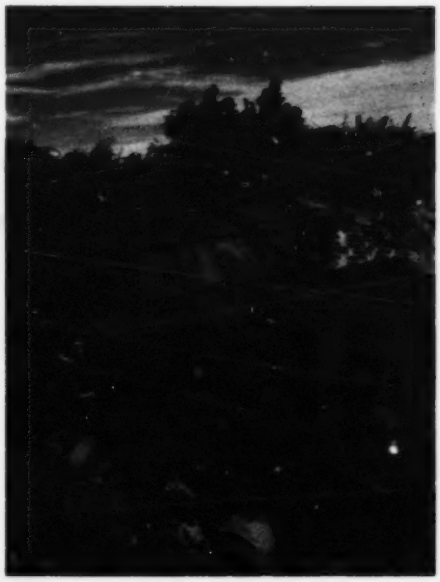
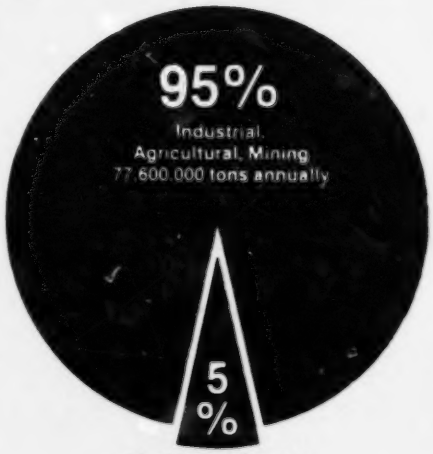
Solid Wastes





Municipal & Sewage
4,100,000 tons annually

The ancient Pueblo Indians could throw their waste material over a cliff.

But today we have many million times as much solid waste, and much of it isn't easily biodegradable. Nationally, an estimated 4.5 billion tons of solid waste are generated annually. Individually, we each create about 3.5 pounds of waste a day, or 1,277 pounds a year.

For years solid wastes were burned. Since this polluted the air we began to bury the waste and sometimes apply a layer of dirt over the refuse. However, recent examples demonstrate that such sites may allow noxious materials to seep through and contaminate underground or surface water. The idea now is to do a better job before wastes reach the disposal site, through source separation (sorting recyclable items from trash) and source reduction (developing products that last longer, can be re-used).

The Resource Conservation and Recovery Act of 1976 broadened the EPA's solid-waste program so that it now includes wastes generated by industry, agriculture, and mining as well as municipal wastes. With help from the EPA, Region 8's six states are developing management plans for the disposal of solid waste. Aided in many cases by grants from the EPA, the states are also undertaking programs to recycle oil, dispose of abandoned automobiles, use sewage sludge beneficially, and separate paper from other sources of waste.

A growing concern of the EPA is the lack of adequate sites for disposing of hazardous wastes. Because much of this waste is created by industry, the EPA is evaluating state regulation of industrial wastes. Adequate hazardous-waste programs will continue to be authorized and funded by EPA grants; where such programs are incomplete or nonexistent, the EPA itself will develop a permit program for the generation, storage, treatment, and disposal of hazardous waste.

Through grants, through regulations, through technical assistance, through permits, and through many other means, the EPA is working to achieve the objectives Congress has set for conserving and recovering our resources.

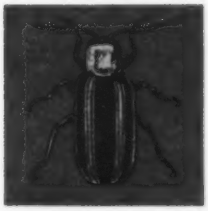
Photograph courtesy of the
Montana State Historical Society

Pesticides

Remember when we thought that DDT was a miracle pesticide? But the trouble with DDT (and with other chlorinated hydrocarbons like chlordane, heptachlor, dieldrin, and aldrin) was that its effects were too long-lasting and far-reaching. The hydrocarbons killed off fish, birds, and other animals in the food chain whose death hadn't been intended. When traces of pesticides were even found in human tissue, we knew they had to go.

The EPA now requires all pesticide manufacturers to register with the Agency. Manufacturers must prove a pesticide's safety before it will be registered, and the EPA may cancel or suspend the registration of a potentially dangerous product. The EPA also requires that container labels specify how a product can legally be used. Further, the EPA works through state governments to restrict the use of certain pesticides (in particular, the organophosphates and carbamates, which, although they degrade quickly, are toxic and therefore dangerous to use) to certified "applicators." (In Region 8 there are about 60,000 private applicators and 10,000 commercial ones.)

The EPA's positive approach has been to support research to develop pesticides that are safe to use, safe to destroy, and target-specific, that is, kill only the pest they are intended to kill.



Wherever possible, the EPA tries to educate people both to the dangers of pesticides still in use (by teaching migrant farm workers to recognize and treat pesticide poisonings, for instance) and to the value of using alternatives, such as an integrated pest-control program. Utah recently developed a program that relies on planting and harvesting at the proper time, rotating crops, and using natural parasites and predators more than insecticides.

The EPA's efforts have apparently helped. Since 1972, slow increases have been noted in the numbers of birds whose populations had been seriously reduced, such as peregrine falcons, bald eagles, brown pelicans, and ospreys. Recent studies show that DDT residues in the food of Americans are only 10 percent of what they were before 1970.

Still, much remains to be learned and taught. In the past, dangerous long-lived pesticides were often, through ignorance, buried who-knows-where; even today, individuals sometimes try to evade the EPA's surveillance. The EPA will continue searching for methods of pest control both truly safe and truly effective.

An infestation of locusts.
Photograph courtesy of the
Utah State Historical Society

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Chisholm Colo. - July 4 - 98

Noise

There's noise you yourself can do something about—"Please turn down that radio!" And then there's environmental noise—occupational noise from machines where you work, and nonoccupational noise from jet plane take-offs, trucks, buses, motorcycles, railroads, air compressors, snowmobiles in quiet places, and so on.

Excessive environmental noise can impair heart, nerve, and glandular functions. It can cause loss of hearing, interfere with sleep, reduce ability to concentrate, and lead to anxiety and depression. Temporary effects may become permanent.

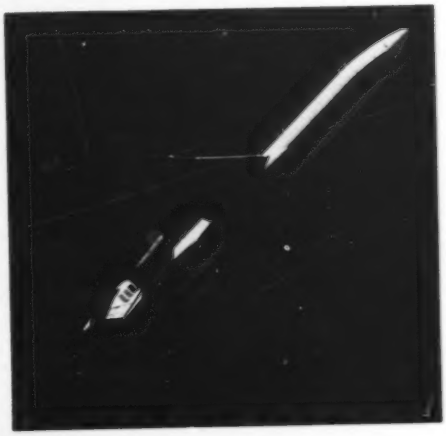
Since 1972 noise has been considered an environmental pollutant. The EPA has set noise-level standards; it also reviews environmental impact statements for noise impacts.

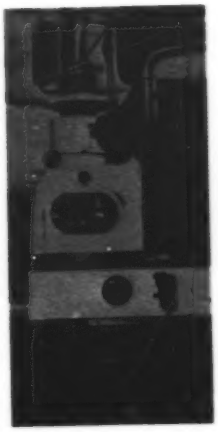
Region 8 believes many sources of noise are best dealt with locally. It has helped many communities develop their own ordinances. Special contracts have been made to help Colorado, Montana, and North Dakota boom-towns work out noise-control programs. Cities in Wyoming, Montana, and South Dakota have recently asked for similar assistance.

Another major emphasis of the EPA has been special projects. In Region 8, one of these was challenging a jet airport proposed for Grand Teton National Park after an "ambient sound level" study showed that building the airport would seriously harm the Park's extremely quiet environment.

Other special projects have included designing a system to assess overall noise in a community by using a tethered balloon which relays noise levels to data recorders on the ground; pilot studies of general airport noise at two small airports; a comprehensive noise survey for Boulder, Colorado; and monitoring of highway noise.

Studying noise pollution, assessing its effects, and working with local governments to help control it — all these form part of a major effort now underway in Region 8.





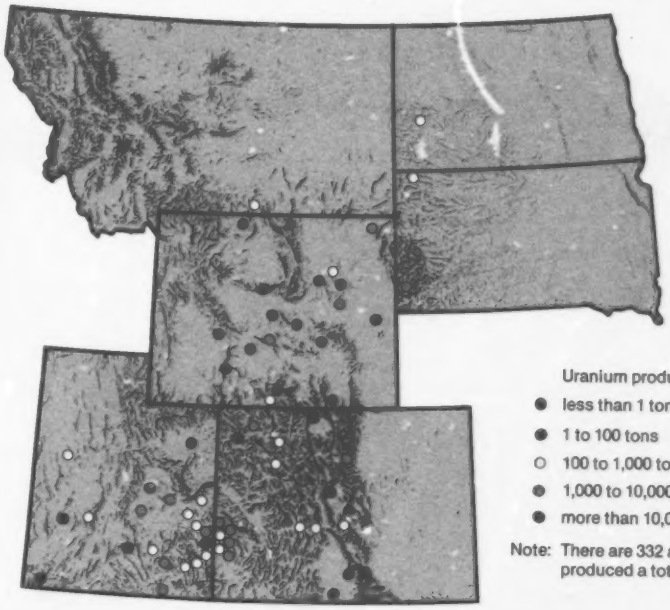
Recent studies show that the increasing number of sources producing high levels of noise combined with the growing population in Region 8 threatens our health and welfare.

Photograph courtesy of
First Federal Savings
Lakewood, Colorado

Radiation

Who would live in a house built over radioactive fill? Well, quite a few people in Grand Junction, Colorado, where contractors in the 1950's and 1960's used mine tailings from a local uranium mill because the material was free for the asking and plentiful. Neither they nor anyone else realized then that these tailings were dangerous. Later . . . but that's another story, because Grand Junction now has a joint federal / state remedial program which Region 8 helped to initiate.

Uranium sold at five dollars a pound in the mid-1960's. Now it's over forty dollars a pound, and the uranium industry is booming. So are other industries, like the recovery of oil from oil shale and the production of coal and phosphates, that also disturb the earth's protective crust and can increase potential exposure to radioactive material through the air, through water, by contact, or along a contaminated food chain.



Uranium production through 1974.

- less than 1 ton
- 1 to 100 tons
- 100 to 1,000 tons
- 1,000 to 10,000 tons
- more than 10,000 tons

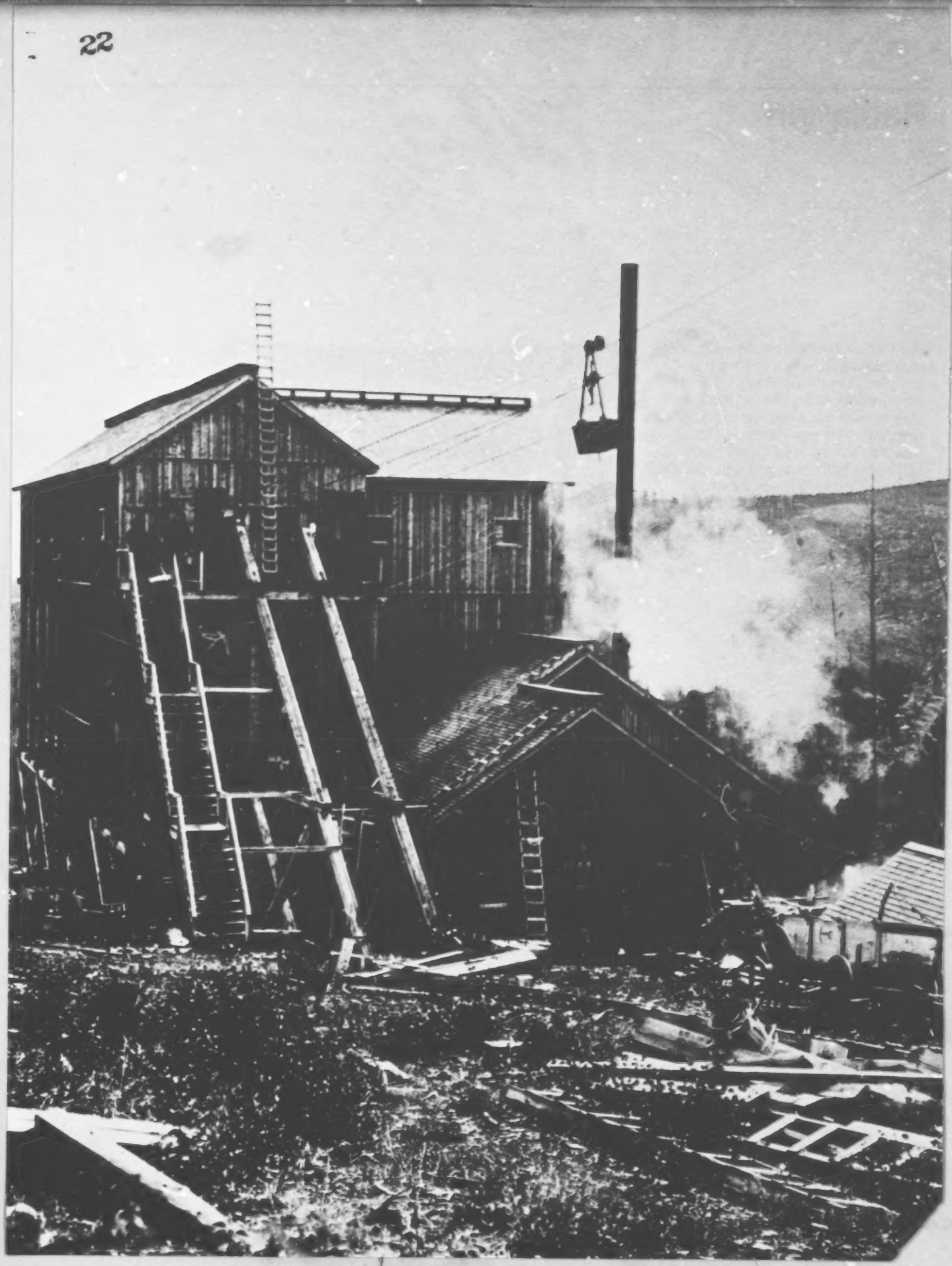
Note: There are 332 areas not shown that have produced a total of 180 tons

Photograph courtesy of U.S. Department of Energy

But new on the scene in Region 8 since 1970 is the EPA. The Region 8 office doesn't regulate, but it does supply, from its knowledge of radiation hazards, the best technical guidance on ways to control them. It also conducts technical reviews of environmental impact statements for all uranium milling licensed by the Nuclear Regulatory Commission and their agreement states. It gives technical assistance to states upon request. It provides for environmental sampling and laboratory analysis for radioactive contamination. Also, it identifies potential radiological impacts from any source, and evaluates ways of handling these hazards. To assist state and local officials in dealing with increasing development of uranium resources, the EPA has prepared a *Uranium Mine and Mill Siting Guide.*

Whenever radiation turns up in our air and water where it can affect public health and safety, it becomes the concern of the EPA, which can then step in to assess these effects.

At the turn of the century, Madam Curie discovered radium from uranium ore mined in Utah. Photograph courtesy of the Utah State Historical Society



Energy Development

Photograph courtesy of the Wyoming State Museum

Gaping black holes in hillsides . . . livid yellow stains on slopes . . . dumps of broken glass and rusted cans . . . heaps of slag . . . thousands of acres of scarred land — valueless, irreclaimable. That is Region 8's inheritance from the old mining days when its mountains were scoured for what they would yield in gold, silver, copper, or coal.

But now that the new Energy Rush days are upon us, surely we have learned our lesson. Surely we will know better than to deface the land we love. In the not-so-good old days, protecting the environment was not a matter of public policy. Now it is. The EPA has been given that explicit charge, and while it doesn't shut its eyes to the magnitude of the questions the new energy boom is bringing, it does assume that with good will and hard work, answers can be found.

Toward that end, it will bring to bear all its powers — of grants for research, of experience gained, of the advice of many knowledgeable individuals, of cooperation with branches of government and with thousands of concerned citizens.

That our energy needs are serious and real is hard to dispute. For various reasons, the federal government has committed itself to trying to fill them within the borders of our own country. The part of the country where awesome deposits of coal and oil shale are found is Region 8.

In some places work to extract these fuels has already begun; in others, workers are poised to start. It will be up to the EPA and the individual states to see that standards set for air quality, water quality, and disposal of solid wastes are met by the energy industries.

The EPA must also set up criteria establishing what elements constitute hazardous wastes and then undertake the difficult and complex task of finding sites where such wastes can be disposed of safely.

Most of the coal in Region 8 is found in Colorado, Montana, North Dakota, and Wyoming. Mining it may pollute both surface water and underground water.

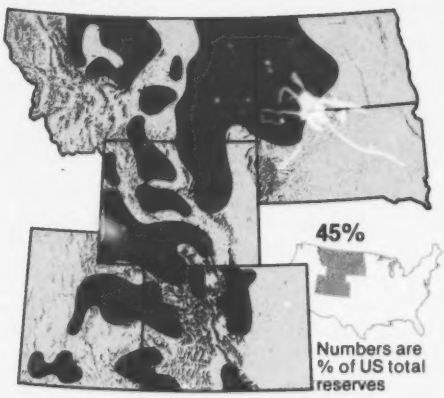
If multi-megawatt power plants are built to burn coal they will produce air pollutants, water pollutants, and solid wastes.

But standards do exist, and the EPA does have supervisory authority to see that they are not exceeded.

A great oil-shale deposit, the Green River Formation, underlies part of Colorado, Wyoming, and Utah. The largest part of it, 85 percent, is found in the Piceance Basin near Rifle, Colorado. Heated oil shale yields a product that can be refined into oil and gas, through a process called retorting. Conventional retorting uses crushed oil shale heated aboveground. In situ ("in place") retorting takes place underground.

Energy Development

Coal Resources



In conventional retorting, the spent shale left after the oil has been removed has 30 percent more volume than the original ore. That means a tremendous quantity of waste rock to be removed. Leaching of salts from spent shale and pollution during the in situ process are also problems. Here the EPA's research skills and facilities are being drawn upon in the search for answers.

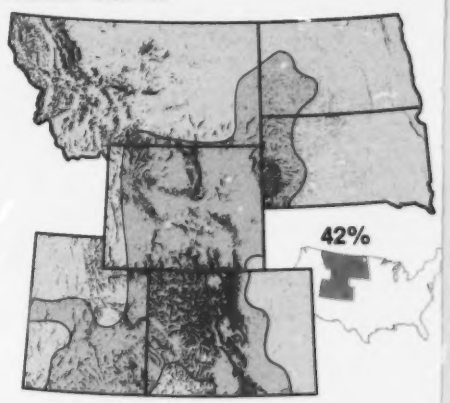
The energy boom will take many thousand acres of land from their former uses, such as farming, ranching, and habitat for wildlife. The EPA is funding research on ways to reclaim and revegetate this land.

Oil & Gas Reserves

Findings to date suggest it may be difficult to re-establish the same hardy native plants on soils changed by oil-shale mining or surface coal mining. But time remains, and study continues.

All mining processes and facilities require considerable quantities of water, but water is scarce in this region. What there is must be shared not only with its present users, both human and animal, but also with all the newcomers crowding into the boom-towns. The surge of population, often in relatively rural areas, puts other new pressures on the environment. Here, too, the EPA must see that standards for air quality, water quality, noise, and solid-waste disposal are met.

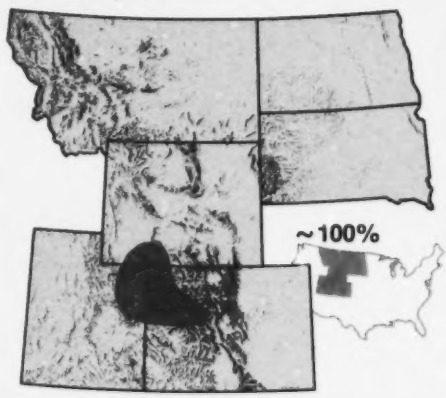
Uranium Reserves



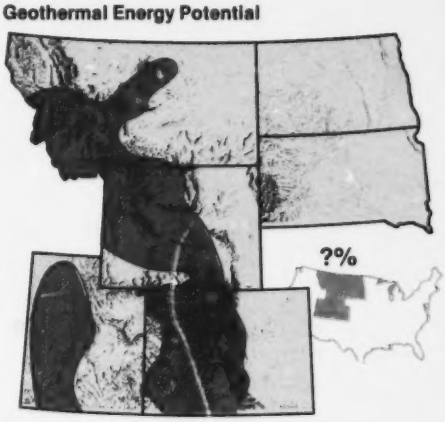
New transportation systems for the coal and oil-shale areas will be essential. These systems too will have significant additional impact on the environment.

The people in Region 8 headquarters know the road ahead will be a rocky one. Problems such as finding new sources of water or setting up equitable arrangements to share what is available will be troublesome. However, the EPA's experience in setting and applying standards, supplying technical skills and laboratory services, and its ability to do research itself and to fund research by others should prove invaluable.

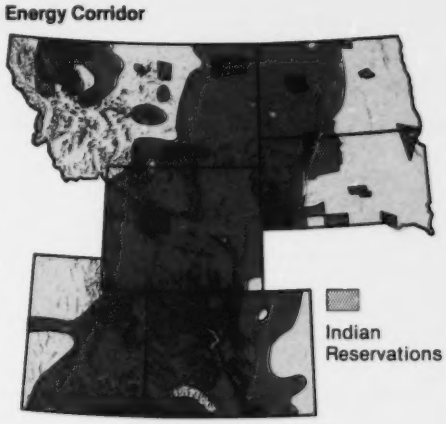
Oil Shale Deposits



Geothermal Energy Potential



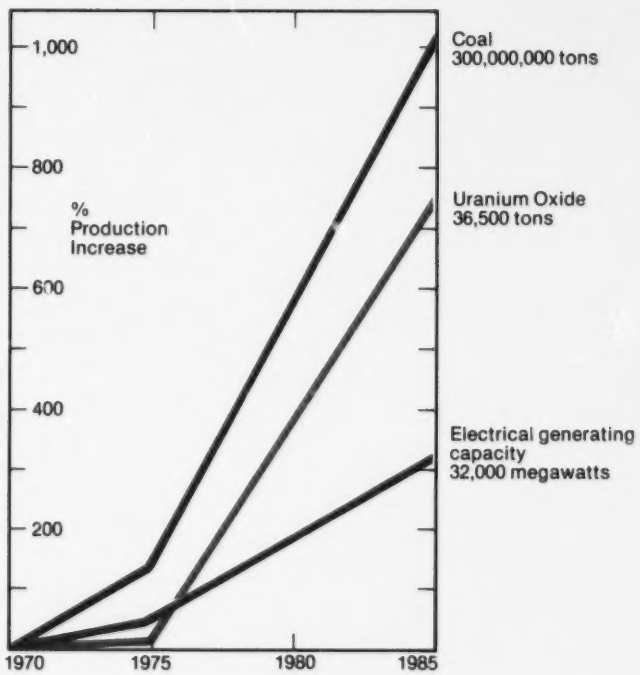
Energy Corridor



Region 8 Energy Reserves

Coal (tons)	195,000,000,000
Uranium (tons)	131,000
Oil (barrels)	2,000,000,000
Gas (cubic feet)	10,000,000,000,000
Oil shale (barrels)	600,000,000,000
Tar sands (barrels)	25,000,000,000

Please note figures above are estimates and not all of any given reserve is recoverable for technical, economic, and/or practical reasons.



Perspective

Seen in perspective, it is Region 8's geography and geology that have preserved in it the Great Open Spaces, pristine air, and clear streams once found throughout the entire country. But as what was once common becomes rare, it becomes more valuable. So people come West. By their very presence they contribute to the pollution they had hoped to escape. The Nation's need for new energy sources is a problem. Pollution is a related problem. Tremendous growth is a problem compounding all the others.

At high altitudes, with less oxygen in the air, cars generate pollutants more freely than elsewhere. Coal mining and oil-shale recovery leave not only solid wastes that must be removed but also land difficult to reclaim and revegetate. Uranium mining and milling create hazardous wastes for which no safe disposal sites have yet been found. Mining, power plants burning coal, agriculture and boom-towns all need additional quantities of water this semi-arid region finds hard to supply. To the fugitive dust already present in the air, mining may add coal dust and dirt. Oil-shale operations may pollute streams. Boom-towns will raise noise levels.

Fortunately, there is another column in the ledger. In it we might set down the 33 percent of the land in Region 8 that is public property, where your public agencies can be directed to do the necessary work of protecting the air, water and land. We could add the enormous amount of assistance the EPA itself provides (standards set, technical expertise provided, programs developed, grants made available). And there are, again, people — people who care.

Photograph courtesy of the
South Dakota State Historical Society

For Further Information

If you would like additional information about specific environmental programs in which EPA is involved, please contact us by writing EPA, 1860 Lincoln Street, Denver CO 80295 or telephone (303) 837-2879. It may be necessary to route your call to specific individuals or programs within the Agency but we will work hard to minimize any inconvenience to you. Following is a listing of some of the Agency's frequently called numbers you may find useful.

For general assistance:
Office of Public Awareness and Intergovernmental Relations ..... (303) 837-2879

Air Quality 837-3471
Auto Emissions 837-3711
State Implementation Plans 837-3711
Prevention of Significant Deterioration (PSD) Review 837-3763

Water Quality 837-4871
Grants 837-3961
Planning 837-3886
Environmental Impact Statements 837-4831
Control Technology Branch 837-2735

Solid Wastes 837-2221
Pesticides 837-3926
Toxic Materials 837-3926
Noise 837-2221
Radiation 837-2221
Energy Development 837-5914
Enforcement 837-3868
Permits 837-4335

Montana Operations Office ..... (406) 449-5434
391 South Park, Helena MT 59601

If you would like more information on issues closer to home, consider beginning with your city or county government. At the State level, the following organizations stand ready to assist you:

Colorado (AIR)
Department of Health
11th & Bellaire Streets, Denver CO 80220
320-4180

Colorado (Water and others)
Department of Health
4210 E. 11th Avenue, Denver CO 80220
320-8333

Montana
Department of Health
Environmental Sciences Division
Cogswell Building, Helena MT 59601
449-3946

North Dakota
Division of Environmental Engineering
1200 Missouri, Bismarck ND 58501
224-2348

South Dakota
Department of Environmental Protection
Joe Foss Building, Pierre SD 57501
773-3351

Utah
Environmental Health Services
P.O. Box 2500
Salt Lake City UT 84110
533-6121

Wyoming
Department of Environmental Quality
Hathaway Building, Cheyenne WY 82001
777-7391

For supplementary technical background data on air and water quality trends see *Water and Air Quality Trends in Region 8*, (PB-283 280/AS, price code A07).

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So there it is . . . our first attempt to provide you with an overview of environmental quality in the region. As you have seen, there is much to be proud of and much to be concerned about. Generally, we enjoy good water quality. Clean air prevails over large expanses. Progress is being made in efforts to preserve quiet, to deal with problems of energy development, radiation, pesticides, solid wastes and toxic materials. But there remain too many instances of degraded water. Nearly one-third of the region's people breathe unhealthy air much too frequently. Substantial problems remain in seeking that important balance between the Nation's energy needs and the protection of the air, water and land systems upon which all life depends.

This report has looked at environmental quality, "Yesterday and Today". The larger question is, of course, "What about tomorrow? How will next year's report read?" Part of that answer must come from State and local governments and the EPA as we go about the job bestowed upon us. But ultimately, that answer must come from each of you.

Roger L. Williams
Deputy Regional Administrator